

CLAIMS

1. A substrate cleaning apparatus comprising:
a processing bath to be filled with a cleaning chemical;
5 an ultrasonic oscillator disposed in the processing bath and
immersed in the cleaning chemical; and
a retainer for retaining a substrate to be immersed in the cleaning
chemical such that ultrasonic waves originating from the ultrasonic
oscillator are radiated onto a back surface of the substrate.

10 2. The substrate cleaning apparatus according to claim 1, wherein
the ultrasonic oscillator has a plurality of oscillation sources disposed
in a dispersed manner.

15 3. The substrate cleaning apparatus according to claim 1, further
comprising a rotary mechanism for rotating the substrate retained by
the retainer.

20 4. The substrate cleaning apparatus according to claim 1, further
comprising propagation control apparatus for scattering or damping
ultrasonic waves originating from the ultrasonic oscillator.

25 5. The substrate cleaning apparatus according to claim 4, wherein
the propagation control apparatus is constituted by means of placing,
in a propagation path of ultrasonic waves, a plate-like member having
a plurality of openings selectively formed therein.

30 6. The substrate cleaning apparatus according to claim 4, wherein
the propagation control means includes jet nozzles for squirting a
chemical in the propagation path of ultrasonic waves, thus circulating
a flow of chemical.

7. A method of manufacturing a semiconductor device through use of the substrate cleaning apparatus described in claim 1.

8. A substrate cleaning method characterized in that a substrate
5 whose surface has been processed is immersed in a cleaning chemical filled in a processing bath, and ultrasonic waves are radiated onto a back surface of the substrate, thereby cleaning a front surface of the substrate.

10 9. The substrate cleaning method according to claim 8, wherein ultrasonic waves originate from a plurality of origination sources disposed in a dispersed manner.

15 10. The substrate cleaning method according to claim 8, wherein the substrate is cleaned while being rotated.

20 11. The substrate cleaning method according to claim 8, wherein ultrasonic waves are radiated by way of a propagation control member for scattering or damping ultrasonic waves.

12. The substrate cleaning method according to claim 8, wherein cleaning is effected while the chemical through which ultrasonic waves propagate is stirred or agitated.

25 13. A method of manufacturing a semiconductor device through use of the substrate cleaning method defined in claim 8.